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CALIFORNIA SPECIES OF CORDYCEPS PARASITIC UPON ELAPHOMYCES

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During the past several years *Cordyceps capitata*, a pyrenomycetous parasite of *Elaphomyces*, has been found in the coastal forest of California from Sonoma County northward to Del Norte County and often abundantly so in Mendocino and Humboldt counties. Recently one of

us (Largent) made a collection of *Cordyceps ophioglossoides*, a similar type of parasite, in Del Norte County near the Oregon border. All collections have been made in areas where there was a deep layer of organic matter, and they were always found in dense mixed forests. No collections have been made by us from any other part of the state.

As far as can be determined there are no reports in the literature of the presence of any species of *Cordyceps* parasitic upon *Elaphomyces* from California. Apparently the first and only report of the presence in the state of any of these fungi is that by Harkness and Moore (1880) in which they reported *Torrubia (Cordyceps) militaris*, a species parasitic upon insects, from the vicinity of Sausalito in Marin County. Seaver in his treatment of the genus in 1911 failed to report any species from the West Coast. Mains (1957) in a more recent monograph of North American species reported both *C. capitata* and *C. ophioglossoides* from Oregon and Washington. This present report extends the range of these two species into northern and central California.

Since there are no published descriptions of California material, short descriptions of both species are included. Color citations for *C. capitata* are from Ridgway (1912) while those for *C. ophioglossoides* are from Kornerup and Wanscher (1961).

Key to the species of *Cordyceps* parasitizing *Elaphomyces*

- Stromata clavate; ascigerous portion not strongly differentiated from stipe *C. ophioglossoides*
Stromata capitate; ascigerous portion globose, conic, ovoid or cylindric, abruptly and clearly differentiated from the the stipe *C. capitata*

1. *Cordyceps ophioglossoides* (Fries) Link, Handbuch 3:347. 1833.

Stromata one-third to one-fourth the length of the stipe, not sharply differentiated from the stipe, 13–25 mm long, 2–8 mm thick, clavate, often flattened, even spatulate and grooved at the apex, light olive-brown to dark olive-brown to almost black (3–4, D, 7–8, to 3–4, E, 7–8), tuberculate due to protruding perithecial ostioles; cortex fibrous, concolorous with the stipe base and rhizomorphs (3–4, A-B, 7–8).

Perithecia ovoid with a short neck, 240–600 μ wide, embedded within the stroma; asci cylindrical, 8-spored, unitunicate, narrowing below, 122–306 by 6–7 μ , apex swollen, 6–10 μ wide, with two large, non-amyloid elliptical areas within that do not stain with 3% KOH, phloxine, or Congo Red; ascospores scolecosporous, colorless, 110–250 by 1.5–2.0 μ , breaking up into one-celled segments, 2.5–5.0 by 1.5–2.0 μ ; paraphyses entangled but free, filiform, slightly clavate at the apex, colorless.

Stipe 18–49 mm long, 2–6 mm wide at the apex, up to 10 mm wide on entering *Elaphomyces*, yellowish to yellowish orange (3–4, A–B, 7–8) at the basal one-third to one-half, olive-yellow to light olive-brown (3–4, D, 7–8) at the apical two-thirds to one-half, terete, often flattened, frequently longitudinally grooved.

Collections studied: *Largent* 4145, 5217 (HSC). Extremely abundant, covering nearly 20 square meters, beneath Tanbark oak trees, at the very end of Winchuck Road along the South Fork of the Winchuck River, Six Rivers National Forest, northern Del Norte County, California, 23 Oct 1971.

2. *Cordyceps capitata* (Fries) Link, Handbuch 3:347. 1833.

Stromata 5–20 mm high, 5–20 mm broad at widest portion, conic to convex to subcylindric to subglobose, not clavate, abruptly and well differentiated from the stipe, surface dry, more or less uneven, punctate-roughened from the ostioles of the perithecia, colored dark reddish brown to dark olive-brown, “mummy brown” to “warm sepia” to “bister” to sometimes as pale as “verona brown”, composed of a cortical layer containing numerous perithecia, hyphae pseudo-parenchymatous, no distinct ectal layer; context white, loosely interwoven.

Perithecia ovoid to flask-shaped 650–825 by 260–430 μ , embedded in the cortical layer, walls well differentiated and colored pale brown to tan; asci hyaline, long and narrow, 400–545 by 8–11 μ , with a thickened ring at the apex; ascospores scolecosporous, hyaline, non-amyloid, usually breaking up into one-celled segments that are 15–27 by 1.5–2.5 μ ; paraphyses hyaline, unbranched, tangled.

Stipe 30–80 mm long, 5–15 mm broad at apex; equal or occasionally flattened, usually crooked or bent in one or more places; surface dry, conspicuously fibrillose to fibrillose-scaly; outer layer sometimes becoming broken or rimose with some of the fragments becoming recurved, colored yellow, “primuline yellow” to “yellow ocher” to “antimony yellow” to near “wax yellow”, pallid to whitish at the base, no gray or olive colors noted, context white, floccose; base attached to ascocarps of *Elaphomyces*.

Scattered to gregarious to sometimes abundant in soil in mixed forests in coastal areas of northern California.

Collections studied: Humboldt Co.: *Theirs* 14502, 18380, 24344, 24346. Mendocino Co.: *Largent* 104; *Peters* 729; *Thiers* 8921, 9430, 9600, 9724, 9843, 10052, 10729, 11032, 14638. Sonoma Co.: *Largent* 5544, 5701; *Thiers* 30718. All collections deposited in the cryptogamic herbaria of either California State University—San Francisco or California State University—Humboldt.

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